HW Assignment Solution for EML 4806 CH 2

Problem 2:

$$R = \text{rot}(\hat{x}, 45^\circ)\,\text{rot}(\hat{y}, 30^\circ)$$

$$= \begin{bmatrix} 1 & 0 & 0 \\ 0 & .707 & -.707 \\ 0 & .707 & .707 \end{bmatrix} \begin{bmatrix} .866 & 0 & .5 \\ 0 & 1 & 0 \\ -.5 & 0 & .866 \end{bmatrix}$$

$$= \begin{bmatrix} .866 & 0 & .5 \\ .353 & .707 & -.612 \\ -.353 & .707 & .612 \end{bmatrix}$$

Problem 4:

$$R = \text{rot}(\hat{z}, 30^\circ)\,\text{rot}(\hat{x}, 45)$$

$$= \begin{bmatrix} .866 & -.353 & .353 \\ .50 & .612 & -.612 \\ 0 & .707 & .707 \end{bmatrix}$$

Problem 28:

$${}^{A}_{C}T = \begin{bmatrix} 0 & -0.5 & 0.866 & 3 \\ 0 & 0.866 & 0.5 & 0 \\ -1 & 0 & 0 & 2 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

Problem 29:

$${}^{B}_{C}T = \begin{bmatrix} 0 & 0.5 & -0.866 & 0 \\ 0 & -0.866 & -0.5 & 0 \\ -1 & 0 & 0 & 2 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

Problem 37:

Form (2,4) element of $-{}^{A}_{B}R^{T\,A}P_{\text{borb}}$

To get: -6.4

Problem 43:

a) Use (2.64) to obtain

$$ {}^{A}_{B}R = \begin{bmatrix} .330 & -.770 & .547 \\ .908 & .418 & .0396 \\ -.259 & .483 & .837 \end{bmatrix} $$

b) Answer is the same as in (a) according to (2.71)